CLAIMS

1. (CURRENTLY AMENDED) A method of path planning, comprising:

providing a medical imaging dataset representing a cavity and a boundary;

providing a plurality of points in said dataset, including at least a starting point and an ending point; and

automatically determining a path between the starting point and the ending point, responsive to a penalty function defined by penalty values associated with passing through various points in the cavity.

2. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said penalty function is responsive to a morphology of the cavity.

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3. (PREVIOUSLY PRESENTED) A method according to claim 2, wherein said morphology comprises a width.

4. (PREVIOUSLY PRESENTED) A method according to claim 2, wherein said morphology is a local morphology.

5. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said penalty function is responsive to the path.

6. (PREVIOUSLY PRESENTED) A method according to claim 5, wherein said penalty function is responsive to an amount of local bending of the path.

7. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining a trajectory of an origin of a viewport.

8. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein providing a plurality of points comprises providing a trajectory.

9. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining a trajectory of an aiming point.

10. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining an angular orientation of a line of sight, relative to a path traveled by a viewport origin.

11. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining an angular orientation of a line of sight, relative to a path traveled by a viewport origin, responsive to a local width of the cavity.

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12. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining an angular orientation of a line of sight, relative to a path traveled by a viewport origin, responsive to a local bend of the path.

13. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises automatically determining at least one viewing parameter along a trajectory of a view origin point.

14. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said penalty depends on a viewing quality possible from a point.

15. (PREVIOUSLY PRESENTED) A method according to claim 14, wherein said viewing quality depends on human perceptual abilities.

16. (PREVIOUSLY PRESENTED) A method according to claim 14, wherein said viewing quality depends on a specific task to be performed with said path.

17. (PREVIOUSLY PRESENTED) A method according to claim 1, comprising smoothing the path.

18. (PREVIOUSLY PRESENTED) A method according to claim 17, wherein said smoothing is dependent on a local width of the cavity, at the smoothed portion of the path.

19. (PREVIOUSLY PRESENTED) A method according to claim 1, comprising automatically repeating at least said automatically determining a path between said starting and ending points.

20. (PREVIOUSLY PRESENTED) A method according to claim 1, comprising providing at least one user-provided limitation on said path determination.

21. (PREVIOUSLY PRESENTED) A method according to claim 19, wherein automatically repeating comprises automatically repeating automatically determining a path, responsive to at least one user-provided limitation.

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22. (PREVIOUSLY PRESENTED) A method according to claim 20, wherein said at least one limitation comprises a rigid limitation.

23. (PREVIOUSLY AMENDED) A method according to claim 20, wherein said at least one limitation comprises a flexible limitation.

24. (PREVIOUSLY PRESENTED) A method according to claim 20, comprising indicating to a user which limitations are not met.

25. (PREVIOUSLY PRESENTED) A method according to claim 1, comprising selecting a data granularity level for said path determination.

26. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein automatically determining a path comprises evaluating a penalty function for the points.

27. (PREVIOUSLY PRESENTED) A method according to claim 26, wherein said penalty function is dependent on the distance of the point from a boundary of the cavity.

28. (PREVIOUSLY PRESENTED) A method according to claim 27, wherein said penalty function is lower for points which are further from the boundary.

29. (PREVIOUSLY PRESENTED) A method according to claim 28, wherein said penalty function has a substantial rate of increase when approaching said boundary.

30. (PREVIOUSLY PRESENTED) A method according to claim 28, wherein said penalty function has a low rate of change away from said boundary.

31. (PREVIOUSLY PRESENTED) A method according to claims 27, comprising determining said distance by erosion of the dataset.

32. (PREVIOUSLY PRESENTED) A method according to claim 27, comprising determining said distance by wave propagation from the boundaries of said cavity.

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33. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said determining a path comprises determining a relatively short path.

34. (PREVIOUSLY PRESENTED) A method according to claim 33, wherein a relatively short path comprises a shortest path which takes into consideration the penalty value associated with the various locations.

35. (PREVIOUSLY PRESENTED) A method according to claim 33, wherein automatically determining a path comprises generating a graph representing at least a portion of the cavity.

36. (PREVIOUSLY PRESENTED) A method according to claim 35, wherein said path is determined by applying a path finding method to the graph and wherein said portions of said graph are generated only when needed by said method.

37. (PREVIOUSLY PRESENTED) A method according to claim 35, wherein automatically determining a path comprises determining a path using Dijkstra's shortest path finding method on said graph.

38. (PREVIOUSLY PRESENTED) A method according to claim 35, wherein said graph includes only a subset of voxels in said cavity.

39. (PREVIOUSLY PRESENTED) A method according to claim 38, wherein said graph comprises substantially only a skeleton of said cavity.

40. (PREVIOUSLY PRESENTED) A method according to claim 39, wherein said skeleton is found utilizing data from erosion of the cavity, which erosion is utilized to determine a distance of interior points from said boundary.

41. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said dataset is represented by voxels.

42. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said boundary is represented by polygons.

43. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said dataset comprises a CT dataset.

44. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said dataset comprises an MRI dataset.

45. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said dataset comprises a NM dataset.

46. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said boundary has small holes therein and wherein said path does not pass through holes narrower than a predetermined width.

47. (PREVIOUSLY PRESENTED) A method according to claim 46, wherein said predetermined width is dependent on a morphology of the cavity.

48. (PREVIOUSLY PRESENTED) A method of path planning, comprising:

providing a medical dataset representing a cavity having a plurality of bends and a boundary;

providing a plurality of points in said dataset, including at least a starting point and an ending point;

automatically determining a path between the starting point and the ending point, wherein said path does not remain substantially in a medial axis of the cavity and does not approach closer than a predetermined distance to said boundary, in at least two of said bends.

49. (PREVIOUSLY PRESENTED) A method according to claim 48, wherein said dataset is represented using voxels and wherein said path does not approach closer than one voxel to said boundary.

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50. (PREVIOUSLY PRESENTED) A method according to claim 48, wherein said dataset is represented using voxels and wherein said path does not approach closer than three voxels to said boundary.

51. (PREVIOUSLY PRESENTED) A method according to claim 48, wherein said dataset is represented using voxels and wherein said path does not approach closer than one tenth the local width of said cavity, to said boundary.

52. (PREVIOUSLY PRESENTED) A method according to claim 48, wherein said dataset is represented using voxels and wherein said path does pass through holes in said boundary which are narrower than a predetermined width.

53. (PREVIOUSLY PRESENTED) A method of simultaneously distance determining and skeletonizing a dataset including a cavity and a boundary thereof, comprising:

eroding said cavity, using a series balls of increasing radius R_i;

determining a distance of points interior to the cavity, from the boundary, utilizing said erosion;

opening said eroded cavity, for each radius R_i, using a ball of radius 1; and

accumulating the points which are removed from said eroded cavity by said opening, to form a skeleton.

54. (PREVIOUSLY PRESENTED) A method according to claim 53, wherein erosion by a ball R comprises eroding the result of eroding with a ball of radius R-1, with a ball of radius 1.

55. (CURRENTLY AMENDED) A method of path planning, comprising:

providing a dataset representing a cavity and a boundary;

providing a plurality of points in said dataset, including at least a starting point and an ending point; and

automatically determining a path between the starting point and the ending point, responsive to a penalty function defined by penalty values associated with passing through various points in the cavity.

56. (PREVIOUSLY PRESENTED) A method according to claim 55, wherein said penalty function is responsive to a width of the cavity.

57. (PREVIOUSLY PRESENTED) A method according to claim 55, wherein said penalty function is responsive to an amount of local bending of the path.

58. (PREVIOUSLY PRESENTED) A method according to claim 55, wherein automatically determining a path comprises evaluating a penalty function for the points.

59. (PREVIOUSLY PRESENTED) A method according to claim 58, wherein said penalty function is dependent on the distance of the point from a boundary of the cavity.

60. (PREVIOUSLY PRESENTED) A method according to claim 59, wherein said penalty function is lower for points which are further from the boundary.

61. (PREVIOUSLY PRESENTED) A method according to claim 55, wherein said determining a path comprises determining a relatively short path.

62. (PREVIOUSLY PRESENTED) A method according to claim 61, wherein a relatively short path comprises a shortest path which takes into consideration the penalty value associated with the various points.

63. (PREVIOUSLY PRESENTED) A method according to claim 61, wherein automatically determining a path comprises generating a graph representing at least a portion of the cavity and wherein said path is determined by applying a path finding method to the graph and wherein said portions of said graph are generated only when needed by said method.

64. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said penalty function is responsive to an Euclidean distance of said various points from said boundary.

65. (PREVIOUSLY PRESENTED) A method according to claim 1, wherein said path planning allows a path to pass through two diagonally-adjacent voxels.

66. (PREVIOUSLY PRESENTED) A method according to claim 25, wherein said granularity is determined responsive to a morphology of said cavity.

67. (PREVIOUSLY PRESENTED) A method according to claim 66, wherein a local granularity is determined and wherein said morphology comprises a local morphology.

68. (PREVIOUSLY PRESENTED) A method according to claim 67, wherein said local morphology comprises a local width.

69. (PREVIOUSLY PRESENTED) A method according to claim 25, wherein a local granularity is determined and wherein said granularity is determined responsive to a distance of a locality from a cavity boundary.

70. (PREVIOUSLY PRESENTED) A method according to claim 25, wherein a first granularity is determined for a first path planning and comprising repeating said path planning using a second granularity and using said first path as a starting point for said repeated path planning.